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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,704	12/06/2001	Sang-Ho Ahn	9903-045	8392
7590 06/02/2005				
MARGER JOHNSON & McCOLLOM, P.C.		EXAMINER		
1030 S.W. Morrison Street		TRAN, TAN N		
Portland, OR 97205				
		ART UNIT	PAPER NUMBER	
		2826		

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/008,704

Applicant(s)

AHN ET AL.

Examiner

TAN N. TRAN

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 03/18/05.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 20-29, 50, 51, 55-64, 66-80, 82-101, 116, 118, 120-126 and 128-142 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 20-29, 50, 51, 71-80, 82-101, 116, 118, 120-126, 128-132 and 134-142 is/are allowed.  
6) ☒ Claim(s) 55-64, 66-70 and 133 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

  
\_\_\_\_\_  
Primary Examiner  
Art Unit 2826

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### **Claim Rejections - 35 USC § 103**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 55-57,59-64,68,70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noriyuki (JP-05-144869) in view of Huang et al. (6,198,171).

With regard to claim 55, Noriyuki discloses a leadframe that includes a die pad 1 having a uniform first thickness, a leads 3 disposed around the die pad 1 wherein the die pad 1 including a chip attaching part and a peripheral part surrounding the chip attaching part; a semiconductor chip 2 mounted to the chip attaching part, the semiconductor chip 2 having electrode pads 2a, each of the electrode pads 2a directly coupled to a corresponding lead 3 with a bonding wire 4, a package body 5 that encapsulates the semiconductor chip 2, the die pad 1, the bonding wires 4, and a portion of the leads 3 to define inner leads that are disposed inside the package body 5 and outer leads that are disposed outside the package body 5, the inner leads having a uniform second thickness that is greater than the first thickness. (Note fig. 2 of Noriyuki).

Noriyuki does not disclose the tie bars connected to and disposed around the die pad.

However, Huang et al. discloses the support bars 201 connected to and disposed around the die pad 200. (Note figs. 3,4 of Huang et al.).

Therefore, it would have been obvious to one of ordinary skill in the art to form the Noriyuki's device having the tie bars connected to and disposed around the die pad such as taught by Huang et al. in order to secure the interface between semiconductor chips and the die pads.

With regard to claim 56, Noriyuki discloses the inner leads of the leads 3 are formed of a single layer. (Note fig. 2 of Noriyuki).

With regard to claim 57, Noriyuki discloses the first thickness is between about 30 percent to 50 percent of the second thickness. (Note fig. 2 of Noriyuki).

With regard to claim 59, Noriyuki discloses the die pad 1 is located below the leads 3. (Note fig. 2 of Noriyuki).

With regard to claim 60, Noriyuki and Huang et al. do not disclose bonding wires are connected by balls formed on the surface of the leads and stiches formed on the electrode pads. However, it would have been obvious to one of ordinary skill in the art to form bonding wires are connected by balls formed on the surface of the leads and stiches formed on the electrode pads in order to secure the interface between semiconductor chips and the die pads.

With regard to claim 61, Noriyuki and Huang et al. do not disclose metal bumps are formed on the electrode pads of the chip and the stiches are formed on the metal bumps. However, it would have been obvious to one of ordinary skill in the art to form the stiches are formed on the metal bumps in order to secure the electrical connection between semiconductor chip and the leads.

With regard to claim 62, Noriyuki and Huang et al. do not disclose upper and lower portions of the package body with reference to the leads have different thickness each other. However, it

would have been obvious to one of ordinary skill in the art to form upper and lower portions of the package body with reference to the leads have different thickness each other in order to secure the semiconductor chip formed on the die pad of the lead frame. Note (fig. 2 of Suppelsa et al.) is support for well-know position.

With regard to claims 63,64, Noriyuki and Huang et al. do not disclose the tie bar has the same thickness as the leads and the die pad peripheral part. However, it would have been obvious to one of ordinary skill in the art to form the tie bar has the same thickness as the lead and the die pad peripheral part in order to secure the semiconductor chip formed on the die pad of the lead frame. Note (figs.1,2 of Casto (5,014,113)) is support for well-know position.

With regard to claim 68, Huang et al. discloses an adhesive 214 bonds the semiconductor chip 208 to the die pad chip attaching part 200 (Note fig. 3 of Huang et al.).

With regard to claim 70, Noriyuki and Huang et al. do not disclose the semiconductor chip is a memory device and wherein the adhesive is a film made of an epoxy resin. However, it would have been obvious to one of ordinary skill in the art to form the semiconductor chip is a memory device and wherein the adhesive is a film made of an epoxy resin in order to secure the semiconductor chip on the die pad of the lead frame and because such structure is conventional in the art for forming a compact multi-chip package.

Claims 58,66,67,133 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noriyuki (JP-05-144869) in view of Huang et al. (6,198,171) and further in view of Huang (2002/0113305).

With regard to claim 66, Noriyuki and Huang et al. do not disclose the die pad comprises divided first and second die pads.

However, Huang discloses the die pad comprises divided first and second die pads (410,440). (Note fig. 1 of Huang (2002/0113305))

Therefore, it would have been obvious to one of ordinary skill in the art to form the Noriyuki and Huang et al. (6,198,171)'s device having the die pad comprises divided first and second die pads such as taught by Huang (2002/0113305) in order to secure semiconductor dies to be separated from the die pads of the lead frame.

With regard to claim 67, Huang (2002/0113305) discloses the first and second die pads (410,440) each include a chip attaching part and a peripheral part. (Note fig. 1 of Huang).

With regard to claims 58,133, Huang (2002/0113305) discloses the semiconductor chip 12a and another semiconductor chip 12b are of the same type. (Note fig. 6 of Huang (2002/0113305)).

Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noriyuki (JP-05-144869) in view of Huang et al. (6,198,171) and further in view of Kozono (6,177,718).

With regard to claim 69, Noriyuki and Huang et al. (6,198,171) do not disclose the lead frame is made of iron-nickel alloy or copper alloy, and wherein the bonding wires are gold wires.

However, Kozono discloses the lead frame 13 is made of iron-nickel alloy or copper alloy, and wherein the bonding wires 14 are gold wires. (Note lines 16-20, column 6, fig. 21 of Kozono).

Therefore, it would have been obvious to one of ordinary skill in the art to form the Noriyuki and Huang et al. (6,198,171)'s device having the lead frame is made of iron-nickel alloy or copper alloy, and wherein the bonding wires are gold wires such as taught by Kozono in order to prevent the lead frame from broken.

### **Allowable Subject Matter**

2. Claims 20-29,50,51,71-80,82-101,116,118,120-126,128-132,134-142 allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as the peripheral part protrudes only in a direction toward the second semiconductor chip as recited in claim 20, and the peripheral part protruding towards only one of the first and second semiconductor chips as recited in claim 22, the peripheral part protruding away from the die pad chip attaching part only in a direction away from the semiconductor chip as recited in claims 50,71, the peripheral part protruding only in a direction towards the lower semiconductor chip as recited in claim 87, the peripheral part perpendicular to the chip attaching part wherein the peripheral part having a lower surface that is parallel to but not coplanar with the lower side and an upper surface that is coplanar with the upper side as recited in claim 116, the peripheral part only protrudes downward as recited in claim 137, the peripheral part only protruding away from the semiconductor chip as recited in claim 142.

**Response to Amendment**

3. Applicant's arguments with respect to claims 55-64,66-70,133 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

5. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (571) 272-1923. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for after final communications.

Application/Control Number: 10/008,704  
Art Unit: 2826

Page 8

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

TT

April 2005